

TRENDS IN MEDICINAL AND ENVIRONMENTAL SCIENCE: AN INTRODUCTION

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CHAPTER - 7

GEO-POLYMERIZATION WITH PARTICULAR EMPHASIS ON FLY ASH FOR CONSTRUCTION MATERIAL APPLICATIONS

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Abstract

Geo-polymers are a member of the family of inorganic polymers and are chain structures formed on the backbone of Al and Si ions. Geo-polymers are also unique in comparison to other alumino-silicate materials. Geo-polymer technology may reduce the total energy demand for producing concrete and lower the CO₂ emissions into the atmosphere. This chapter explores the role of phosphate-based geopolymer blocks as potential alternatives to traditional cement-based blocks, their characteristics, synthetic routes, and their applications.

Keywords: Geopolymers, Geo-polymers, SiO₄, AlO₄, inorganic polymers,

7.1. Introduction: *Origin and Background of Geo-polymers*

Geo-polymers are a member of the family of inorganic polymers and are chain structures formed on the backbone of Al and Si ions. The chemical composition of this geopolymer material is similar to that of natural zeolitic materials (microporous, crystalline aluminosilicate materials composed of assemblies of SiO₄ and AlO₄ tetrahedra joined through the sharing of oxygen atoms [1]). The polymerization process involves a substantially fast chemical reaction under high alkaline or acidic conditions on Si-Al minerals,